

ROM in a plastic case along with the explanation of why the site was created. If developed using a WIKI or other online tool include a link to the website in the explanation of why the site was created. SF

**CLASS 6** - 3D Printing Unique Items - 3D printing uses plastic or other materials to build a three-dimensional (3D) object for a digital design. Youth may use original designs or someone else's they have re-designed in a unique way. Exhibits will be judged based on the motivation and/or problem identified. For example, 3D objects printed as part of the design process for robot or other engineering project or cookie cutter. Must include design notebook with motivation or problem statement the prototype was 3D printing will include a notebook with the following: a) Define motivation/problem solved, b) Software used, c) Document purpose of material and print settings, d) Material choice (PLA, PVA, ABS, etc.), e) In-fill density, f) Moving parts. SF

**CLASS 7** - 3D Pen Creation - 3D pens rapidly melt and cool plastic filament allowing the 4-H member to draw in 3D. Youth may use original designs or use a template to create their 3D item. Exhibits will be judged based on the complexity of the design and shape. 3D pen creation will include a notebook with the following: a) Copy of the template if used and description of any changes the youth created, b) If no template used - an explanation of how the creation was built, c) Must include paragraph of what the youth learned while creating their project (i.e. way to improve their next creation), d) Paragraph on how 3D pens impact science, engineering and technology. SF

**CLASS 8** - Maker Space/Digital Fabrication - This project is a computer generated projected created using a laser cutter, vinyl cutter, heat press or CNC router. Vector or 3D based software such as Corel Draw or Fusion 360 would be an example of an appropriate software used to create your finished project. Project should include a notebook with the following: a) What motivated you to create this project, b) Software and equipment used, c) Directions on how to create the project, d) Prototype of plans, e) Cost of creating project, f) Iterations or modifications made to original plans, g) Changes you would make if you remade the project. SF

**DEPARTMENT H, DIVISION 865 - DIGITAL VIDEO PRO**  
**Premiums: Purple, \$4.00; Blue, \$3.00; Red, \$2.50; White, \$2.00**

**CLASS 1** - Video. Exhibit will be a video using skills learned in the project. Include written information on how you made the video and how you edited the video.

**DEPARTMENT H, DIVISION 870 - ELECTRICITY**  
**Premiums: Purple, \$4.00; Blue, \$3.00; Red, \$2.50; White, \$2.00**

One entry per each class. The name and county of each exhibitor should appear separately on the back of each board, poster or articles and on the front cover of the notebooks so owner of exhibit may be identified if the entry tag is separated from the exhibit.

Display board should be a height of 24 inches and not to exceed 1/4 inch in thickness. A height of 24 7/8 inches is acceptable to allow for the saw kerf (width) if two 24 inch boards are cut from one end of a 4' x 8' sheet of plywood. **NOTHING SHOULD BE MOUNTED WITHIN 3/4 INCH OF THE TOP OR BOTTOM OF THE BOARD.** Fabricated board such as plywood, composition board, or particle type lumber may be used for demonstration displays. Demonstration boards should be sanded and finished to improve their appearance. The finish on the demonstration board will be judged as a woodworking exhibit. Board should include an

overall title for the display, plus other necessary labeling.

Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned). All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

#### *Magic of Electricity - Unit 1*

**CLASS 11** - Bright Lights - Create your own flash light using items found around your house. Flash lights should be made out of items that could be recycled or reused. No kits please.

**CLASS 12** - Control the Flow - Make a switch. Use the following items: D cell battery, battery holder, insulated wire, 2 or 2.5 volt light bulb, bulb holder, paper clip, cardboard, and two brass paper fasteners to create a circuit that you can open and close.

**CLASS 13** - Conducting Things - Make a circuit with a switch and a light bulb that can be used to test different household items for their ability to act as an insulator or conductor. You must find five items that are conductors and five items that are insulators. Create a table that illustrates your results.

**CLASS 14** - Is There a Fork in the Road - Use the following items to construct one parallel and one series circuit. Items: D cell battery, battery holder, insulated wire, bulb holder and a 2 or 2.5 volt light bulb.

#### *Investigating Electricity - Unit 2*

**CLASS 15** - Case of the Switching Circuit - Use the following items: two D cell batteries, two battery holders, light bulb, bulb holder, a 3 inch by 6 inch piece of cardboard, six brass paper fasteners and approx. two feet of 24 gauge insulated wire to build a three way switch. Write a short essay or create a poster that illustrates how three way switches function.

**CLASS 16** - Rocket Launcher - Construct a rocket launcher out of the following materials: a plastic pencil box that is at least 4 inches by 8 inches, single pole switch, single throw switch, normally open push button switch, 40 feet of 18 or 22 gauge stranded wire, 4 alligator clips, 2 by 6 board (6 inches long), 1/8 inch diameter metal rod, rosin core solder, soldering iron or gun, wire stripper, small crescent wrench, pliers, small Phillips and straight blade screwdrivers, drill, 1/8 inch and 1/4 inch drill bits, rocket engine igniters, additional drill bits matched to holes for two switches. You must successfully build a rocket launcher and light two rocket igniters with your launcher. You DO NOT have to actually fire a rocket off of the launcher. Create a poster using photographs to show the "step by step process" you used to build your launcher.

**CLASS 17** - Stop the Crime - Build an ALARM using the following materials: On-off push button switch, mercury switch, buzzer-vibrating or piezoelectric, 9 volt battery, 9 volt battery holder, 4 inch by 4 inch by 1/8 inch Plexiglas board to mount circuit on; rosin core solder, soldering gun/iron, two feet of 22 gauge wire, wire strippers, hot glue sticks, hot glue gun and a plastic box with a lid to mount your alarm circuit on. Create a poster using photographs to show the "step by step process" you used to build your alarm.

#### *Wired for Power - Unit 3*

**CLASS 1** - Electrical Tool/Supply Kit - Create an electrical supply kit to be used for basic electrical repair around the house. Include a brief description of each item and its use. Container should be appropriate to hold items. SF

**CLASS 2** - Lighting Comparison - Display studying the efficiency of various lighting (incandescent, fluorescent, halogen, Light Emitting Diodes, etc.). Exhibit could be a poster display or an actual item. SF

**CLASS 3** - Electrical Display/Item - Show an application of one of the concepts learned in the Wired for Power project. Examples include: re-wiring or building a lamp, re-wiring or making a heavy duty extension cord or developing an electrical diagram of a house. Exhibit could be a poster display or an actual item. SF

**CLASS 4** - Poster - Should exemplify one of the lessons learned in the Wired for Power Project. Posters can be any size up to 28" by 22". SF

*Electronics - Unit 4*

**CLASS 5** - Electrical/Electronic Part Identification - Display different parts used for electrical/electronic work. Exhibit should show the part (either picture or actual item) and give a brief description, including symbol of each part and its function. Display should include a minimum of 10 different parts. SF

**CLASS 6** - Electronic Display - Show an application of one of the concepts learned in the Electronics project. Examples include: components of an electronic device. (Refer to page 35 of the Electronic manual) SF

**CLASS 7** - Electronic Project - Exhibit an electronic item designed by the 4-H'er or form a manufactured kit that shows the electronic expertise of the 4-H'er. Examples include: a radio, a computer, or a volt meter. SF

**CLASS 8** - Poster - Should exemplify one of the lessons learned in the Entering Electronics Project. Posters can be any size up to 28" x 22". SF

**DEPARTMENT H, DIVISION 900 - PHYSICS/POWER OF WIND  
Premiums: Purple, \$4.00; Blue, \$3.00; Red, \$2.50; White, \$2.00**

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Reports should be written using the scientific method whenever possible (Background, the Question or hypothesis, what you plan to do and what you did, Method used and observations, Results: what you learned). All reports should be computer generated and enclosed in a clear, plastic cover. The reports should be attached securely to the display.

**CLASS 1** - Create and Compare Energy Resources Poster - Poster should explore 2 alternative/renewable energy resources. Compare and contrast the 2 resources including two of the following information: amount of energy created, costs of production, usability of the energy, pros/cons of environmental impacts, etc. Posters can be any size up to 28" by 22." SF

**CLASS 2** - Experiment Notebook - Notebook will explore the scientific method involving alternative/renewable energy sources. Information required. 1) Hypothesis 2) Research 3) Experiment 4) Measure 5) Report or Redefine Hypothesis. SF